

Application No.: 10/690088

Case No.: 58136US004

REMARKS

Favorable reconsideration of this application in the light of the following discussion is respectfully requested. Claims 1 to 14 are pending.

The Patent Office stated that the specification objections as well as the 112-2nd paragraph claim rejection on Claim 11 have been removed. All 102 and 103 rejections in the previous Office Action filed on June 17, 2004, were removed.

Claim Rejections under 35 USC § 103

1. McCarthy et al. in view of Tournut et al.

Claims 1-14 were rejected under 35 USC § 103(a) as being unpatentable over McCarthy et al. (U.S. Patent No. 5,955,556) in view of Tournut et al. (U.S. Patent No. 4,025,481).

Regarding the limitation of parent Claim 1, the Examiner averred that McCarthy et al. disclose the preparation of a stable aqueous self-dispersible fluorinated copolymer dispersion of up to 48% polymer solids in water in the absence of surfactant due to improved conversion rate of monomer to polymer. According to the Examiner, McCarthy et al further discloses during the polymerization process, fluoropolymer macromolecules are produced having inorganic, "surfactant-like" functional end groups which impart excellent latex stability to the polymer even these end groups are present in very low concentration. McCarthy et al furthermore discloses that copolymers can be made from a combination of fluoroolefin(s) and nonfluoroolefin(s).

The Examiner noted that the McCarthy reference is silent about using the presence of fluorinated liquids in the polymerization. However, the Examiner stated that Tournut et al teaches that an inactive halogenated saturated hydrocarbon such as difluorochloromethane or trifluorotrichloroethane useful as a stabilizing agent can be presented in the aqueous emulsion polymerization with the polymerizable fluorinated monomer in order to obtain a stabilized aqueous dispersion and a lower molecular weight since such a halocompound can also be generally useful as chain transfer agent.

According to the Examiner, in light of the fact that copolymer produced by tournut and McCarthy are containing the same type of monomers, which can be obtained through the same type of aqueous emulsion polymerization, one having ordinary skill in the art would have therefore found

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it obvious to modify McCarthy's emulsion polymerization process by adding the saturated fluorinated compounds such as difluorochloromethane or trifluorotrichloroethane as taught by Tournut. The Examiner indicated that one would expect one advantage is to obtain a lower molecular weight and more stability on the final polymeric product since the produced polymer being in the presence of such an inactive stabilizing compounds, which can also be useful as a chain transfer agent.

The Office Action further refers to some of the dependent claims as follows:

Regarding Claims 2-3 and 7, some of the co-polymerization process described in column 5 at line 31 - column 6, line 11 is overlapping limitations of claims 2-3 and 7.

Regarding Claim 5, a particle size in the range of 0.01-1.0 micron is obtained. Therefore, it is overlapping the claimed numbers by conversion.

Regarding Claim 6, inactive fluorinated liquids including 1,1,2-trifluoro-1,2,2-trichloroethane or carbon tetrachloride are delivered into the reactor by known conventional ways used.

Regarding Claim 10, fluorinated vinyl ethers are included.

Regarding Claim 11, some of the copolymer obtained from the references certainly carry the claimed melting point and are substantially amorphous.

Regarding Claims 12 and 13, examples of the radical polymerization initiators are organic or inorganic peroxide, persulfate, azo compound, and the like; they are conventionally used in the art and are thermally initiated.

Regarding Claim 14, various examples of copolymers are from tetrafluoroethylene (TFE) and propylene and can be prepared in any desirable mole ratio.

Remaining dependent Claims 4 and 8-9 were rejected with the above rejection for Claims 1-3, 5-7 and 10-14.

2. Oxenrider et al. in view of Tournut et al.

Claims 1-14 were rejected under 35 USC § 103(a) as being unpatentable over Oxenrider et al. (U.S. Patent No. 5,453,477) in view of Tournut et al. (U.S. Patent No. 4,025,481).

Regarding the limitation of parent Claim 1, the Examiner averred that Oxenrider et al discloses preparation of stable aqueous fluorinated copolymer dispersion in the absence of soaps or

surfactants due to improved wettability of polymer particles. The Examiner also stated that Oxenrider et al further discloses that copolymers can be made from a combination of fluoroolefin(s) and nonfluoroolefin(s).

The Examiner noted that the Oxenrider reference is silent about using fluorinated liquids in the polymerization. According to the Examiner, Tournut et al teaches that an inactive halogenated saturated hydrocarbon such as difluorochloromethane or trifluorotrichloroethane useful as a stabilizing agent can be present in the aqueous emulsion polymerization with the polymerizable fluorinated monomer in order to obtain a stabilized aqueous dispersion and a lower molecular weight since such a halocompound can also be generally useful as chain transfer agent.

The Examiner pointed out that the copolymers produced by Tournut and Oxenrider are containing the same type of monomers, which can be obtained through emulsion polymerization. Therefore, the Examiner averred that one having ordinary skill in the art would have found it obvious to modify Oxenrider's emulsion polymerization process by adding the saturated fluorinated compounds such as tetrafluoroethane or trifluoroethane as taught by Tournut. According to the Examiner, one would expect one advantage is to obtain a lower molecular weight and more stability on the final polymeric product since the produced polymer being in the presence of such an inactive stabilizing compounds, which can also be useful as a chain transfer agent.

The Office Action further refers to some of the dependent claims as follows:

Regarding Claims 2-3 and 7, some of the co-polymerization process described on column 10 at line 16 - column 15, line 31 is overlapping limitations of Claims 2-3 and 7.

Regarding Claim 5, although the reference is silent of a specific particle size, the claimed number being below 150 nm is conventional in the art.

Regarding Claim 6, inactive fluorinated liquids including 1,1,2-trifluoro-1,2,2-trichloroethane or carbon tetrachloride are delivered into the reactor by known conventional way used.

Regarding Claim 10, fluorinated vinyl ethers may be included according to Oxenrider's statement.

Regarding Claim 11, some of the copolymers obtained from the references certainly carry the claimed melting point and are substantially amorphous.

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Regarding Claims 12 and 13, examples of the radical polymerization initiators are organic or inorganic peroxide, persulfate, azo compound, and the like; they are conventionally used in the art and are thermally initiated.

Regarding Claim 14, one example of copolymers is from tetrafluoroethylene (TFE) and ethylene and can be prepared.

Remaining dependent Claims 4 and 8-9 were rejected with the above rejection for Claims 1-3, 5-7 and 10-14.

Applicants' Response to the Claim Rejections under 35 USC § 103

Applicants respectfully traverse both of the rejections under 35 USC §103.

1. McCarthy et al. in view of Tournut et al.

The present invention relates to a process of making a copolymer of fluorinated olefin and hydrocarbon olefin selected from ethylene, propylene and mixtures thereof. The process comprises a substantially emulsifier free aqueous emulsion polymerization of the fluorinated olefin and the hydrocarbon olefin. The copolymerization of the fluorinated olefin and the hydrocarbon olefin is in the presence of fluoropolymer particles and/or in the presence of fluorinated liquid that is in a form suitable for improving the co-polymerization of the fluorinated olefin and the hydrocarbon olefin.

While McCarthy et al. do describe aqueous emulsion polymerization, McCarthy et al. fail to teach the inventive process defined by claim 1, as conceded by the Examiner. Additionally, applicants aver that McCarthy et al fails to appreciate the initiation of the reaction with fluoropolymer particles either present or formed in situ in the reactor without feeding substantial amounts of the hydrocarbon olefin.

Tournut et al teaches emulsion polymerization of tetrafluoroethylene, in the presence of a halogenated hydrocarbon, to form aqueous dispersions of polytetrafluoroethylene. The halogenated hydrocarbons are intended as stabilizing agents in the aqueous dispersion. The reference fails to teach, suggest or disclose the use of fluorinated liquids in a substantially emulsifier free aqueous emulsion polymerization process. In fact the reference, in column 2, lines 31 through 39, teaches the away from the present invention. The noted section in column 2 indicates that emulsifying agent

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is a necessary component of the polymerization reaction. Applicants also point out that all of the examples of Tournut et al utilize an ammonium perfluorooctanoate as an emulsifying agent.

Obviousness cannot be established "by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion that the combination be made." *In re Stencel*, 828 F.2d 751, 755, 4 USPQ 2d 1071, 1073 (Fed. Cir. 1987). Such a suggestion is clearly lacking where one or more of the relied upon prior art references teaches away from the claimed invention. Tournut et al. teaches away from the use of fluorinated particles or liquids in an aqueous emulsion polymerization process that is substantially emulsifier free by stating that an emulsifying agent is a necessary component of the polymerization. The emulsion polymerization of McCarthy et al. is insufficient as noted above in applicants' remarks. As a result, it would be improper to combine McCarthy et al. and Tournut et al. as suggested by the Examiner.

Withdrawal of the rejection of claim 1 is respectfully requested. Additionally, the remaining claims 2-14 all depend, either directly or indirectly, from claim 1. Thus, each of these claims is patentable at least on the basis of this dependency from a patentable base claim.

2. Oxenrider et al. in view of Tournut et al.

Oxenrider et al., in contrast to the inventive aqueous emulsion polymerization process discovered by applicants and defined in claim 1, is directed to suspension polymerization. Oxenrider et al. fail to describe any aqueous emulsion polymerization processes other than the cursory mention of emulsion polymerization as one prior art method of preparing fluoropolymers (see e.g., column 1, lines 43-49, "There are presently known a plurality of processes which were suitable for the formation of the homopolymer, polychlorotrifluoroethylene. High molecular weight homopolymers and copolymers of PCTFE may be prepared by free radical initiated polymerization either as bulk, suspension, or aqueous emulsion via the use of a suitable initiator system or in the alternative by ionizing radiation."). Suspension polymerization, however, is distinguished from emulsion polymerization, for example, at page 3, lines 2-9 of the specification.

Tournut et al have been distinguished from the present claims for the reasons set forth in applicants' response to the rejection under McCarthy et al. in view of Tournut et al. Applicants reiterate that the Tournut et al teach away from the use of fluorinated particles or liquids in an aqueous emulsion polymerization process that is substantially emulsifier free. Thus applicants aver

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that the combination of Oxenrider et al and Tournut et al would not result in the present invention. There is no suggestion or teaching in the either reference to lead one skilled in the art to polymerize a polytetrafluoroethylene in accordance with the substantially emulsifier free aqueous polymerization claimed in the present invention.

Withdrawal of the rejection under 35 USC §103 is respectfully requested. The remaining claims 2-14 all depend, either directly or indirectly, from claim 1. Thus, each of these claims is patentable at least on the basis of this dependency from a patentable base claim.

The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. However, applicants do not agree with the Examiner that the reference relates to a process of making a copolymer of fluorinated olefin and hydrocarbon olefin with substantially emulsifier free aqueous emulsion polymerization and in the presence of fluoropolymer particles and/or fluorinated liquid as claimed in the present invention. As such, the reference does not provide a basis for rejecting the claims of record.

Conclusion

In view of the foregoing remarks, favorable reconsideration of the present application and the passing of this case to issue with all claims allowed is courteously solicited.

Should the Examiner wish to discuss any aspect of this application, applicants' attorney suggests a telephone interview in order to expedite the prosecution of the application.

Respectfully submitted,

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Date

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